2005 EWA Review comments: Stephen Monismith 1/16/06

I preface my remarks by noting that I was only able to attend the second day of the review, a day largely spent discussing Delta Smelt. In general, I found that the less formal format of the 2005 review allowed for a more wide-ranging discussion, albeit one that for the most part focused on larger issues of what it is that influences Delta Smelt abundance, and not so much on how the EWA water use may or may not be important to Delta Smelt. It is clear that the POD (Pelagic Organism Decline) problem was looming large over much of the discussion, as was the uncertainty over the status and fate of Calfed as a whole.

Overall, for all its flaws, it seems operationally that EWA is incrementally improving from year to year. E.g. the decision trees have been worked on and improved. This past year, as recommended by previous panels, a hydrodynamic model was used to help guide use of EWA assets. And, of course, as we on the panel have commented in past years, the practical functioning of the EWA as a smart water customer seems to be its strongest feature.

In reflecting on the meeting, I was most struck by the fact that despite years of analysis, there is no agreement as to whether or not exports or flow influence Delta Smelt abundance. For example, BJ Miller argued that the main observable determinant of Delta Smelt abundance is the co-occurrence of prey and smelt, whereas Tina Swanson's analysis did show that flow is important. I recall from the '90s that DS did not seem to respond to X2 like other delta species. I also looked at Bill Bennett's white paper and he shows a very pronounced dependence on exports, although the units of his figure 22 are hard to understand. Thus, the first thing I would conclude is that it should be a high priority to get a working group together that includes several strong bio-statisticians like Alan Jassby, as well as representatives from the different interest groups. The aim would be to produce a convincing and publishable analysis (like the 1995 X2 paper in Ecological Applications) that everyone agrees is correct. The main aim would be to determine given the data we have does DS respond to flow and if so to what magnitude of flow. The reason for this second qualifier is that if the response to EWA flow reduction levels is smaller than what would be needed to produce a response, it will be hard to design an appropriate EWA strategy that would be effective.

At the very least, if this statistics exercise is not feasible, I would think it imperative to get someone on the panel who has the necessary expertise to evaluate ("referee"?) the different results that get presented by parties with different interests, i.e., water contractors, environmental groups and agency scientists.

The second comment I want to make concerns the use of models. I gather that in some fashion the Particle Tracking Model (PTM) was used to help guide the use of EWA resources. It would have been nice to see exactly what was done, i.e., what assumptions were made, what model runs were done, how the model run output was presented to the WOMT etc. Given the swimming ability of DS, and the potential importance of behavior (e.g., phototaxis or tidal migration) it seems that these results should be best at describing

the likelihood that things close (perhaps within 1 tidal excursion) to the pumps get entrained. Thus, for my money it would be useful to establish a few sampling stations within ca. 5 km of Clifton Court since these are the ones for which entrainment might be most accurately predicted. I am not sure if it has been done, but it seems like it might be useful to see if salvage rates can be connected to a few of the existing stations near the pumps (e.g. 20 mm townet station 918).

While there are clearly difficulties with using the PTM, it does seem to be worthwhile to continue exploring using it in EWA deliberations. Perhaps as 3D models like that of Pete Smith (SI3D) or that of my colleague Oliver Fringer at Stanford (SUNTANS) improve they may eventually supplant the 1D DSM2/PTM code. However, I must disagree with the statement in the POD review that the 1D model is already inferior to a 3D model. Our experience has been that in terms of calibration quality current 3D models are at best on par with the 1D model and are often inferior. This is most likely an effect of model resolution – 3D models that truly resolve all the physics are inherently computational expensive[1], and probably cannot be run in the near future in the sort of interactive mode that would be needed to use the model with EWA real time decision making. However, 3D modeling could be used to improve the PTM, for example to better model what happens at junctions, where the PTM assumes the particles are uniformly mixed through the cross-section, whereas in reality they might well be concentrated in some part of the cross section.

Thirdly, I was mystified that VAMP didn't warrant much discussion despite the fact that it is consuming the single largest share of EWA assets. Given that this is supposed to be "Adaptive Management" I have been curious as to why it seems to operate the same way every year, and I don't think we on the panel (at least) have ever been told what hypothesis this "experiment" is supposed to test and how the sampling reflects that hypothesis. I note that several of the San Joaquin websites seem to imply that this use of EWA assets is an established agreement between the various agencies involved. Perhaps next year's review could deal in more depth with VAMP.

The fourth point that I wanted to make was that after 4 years, we still haven't really carried out the key recommendations from the first EWA panel concerning how we should improve our knowledge of the system. As Jim Cowen pointed out, we have even gotten to the potentially awkward state where 1 of the science advisors (Wim Kimmerer) and 2 of the panelists (Ken Rose and myself) were successful in getting Calfed funding to begin later this year one of the projects spelled out in early EWA reviews. In this light, I thought that Wayne White's comment that we should have started this kind of modeling "way earlier" was most telling. I would second the recommendation that Jim Anderson made this year (as in past years) that some of the dollars used to buy EWA be immediately diverted to targeted research relevant to EWA – e.g. the statistical work mentioned above.

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[1] For example, a 5m horizontal resolution grid of Threemile Slough *only* that we have been working with runs ca. 10 x real time on a large DOD cluster computer.

Finally, I think the agencies' staff deserve a lot of credit for the enormous effort they have put in to implement the EWA and to prepare for these reviews, as well as for the positive ways they have responded to our critiques.